

FIG. 1 (PRIOR ART)

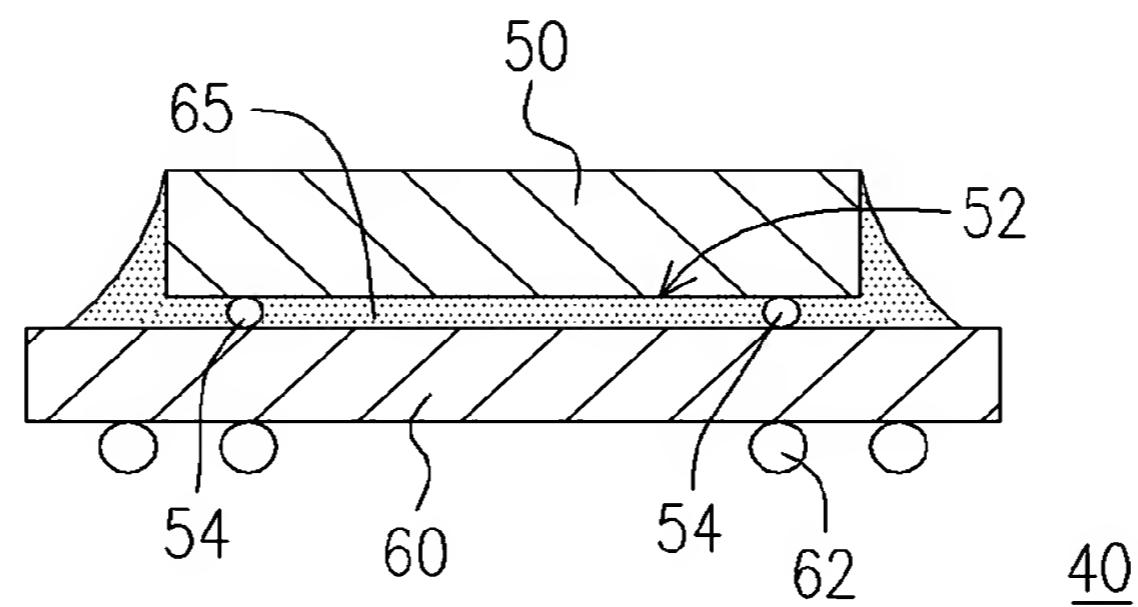


FIG. 2 (PRIOR ART)

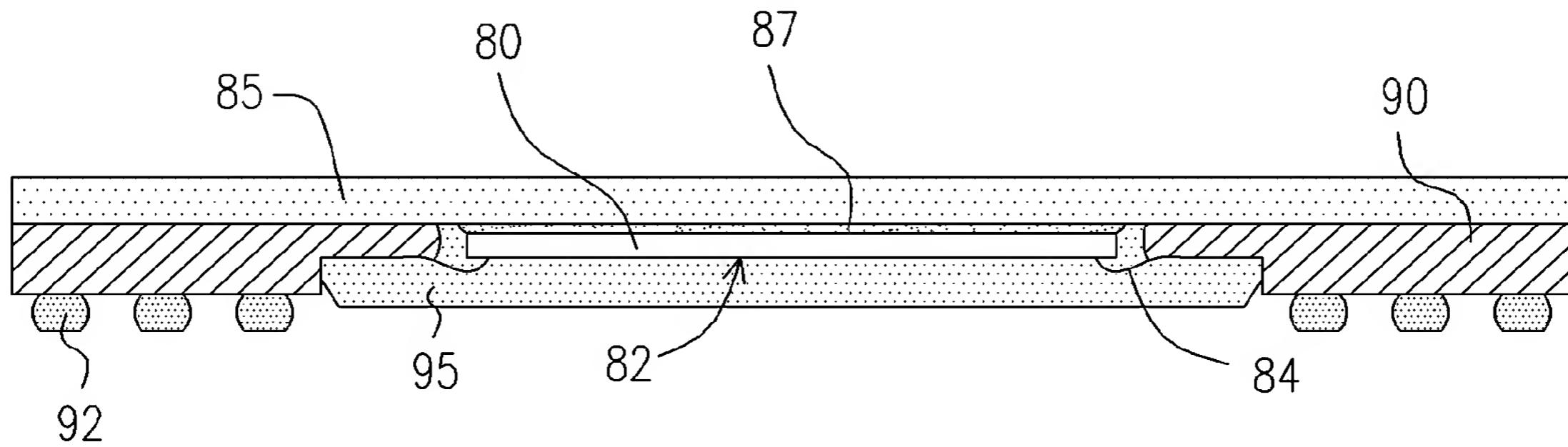


FIG. 3 (PRIOR ART)

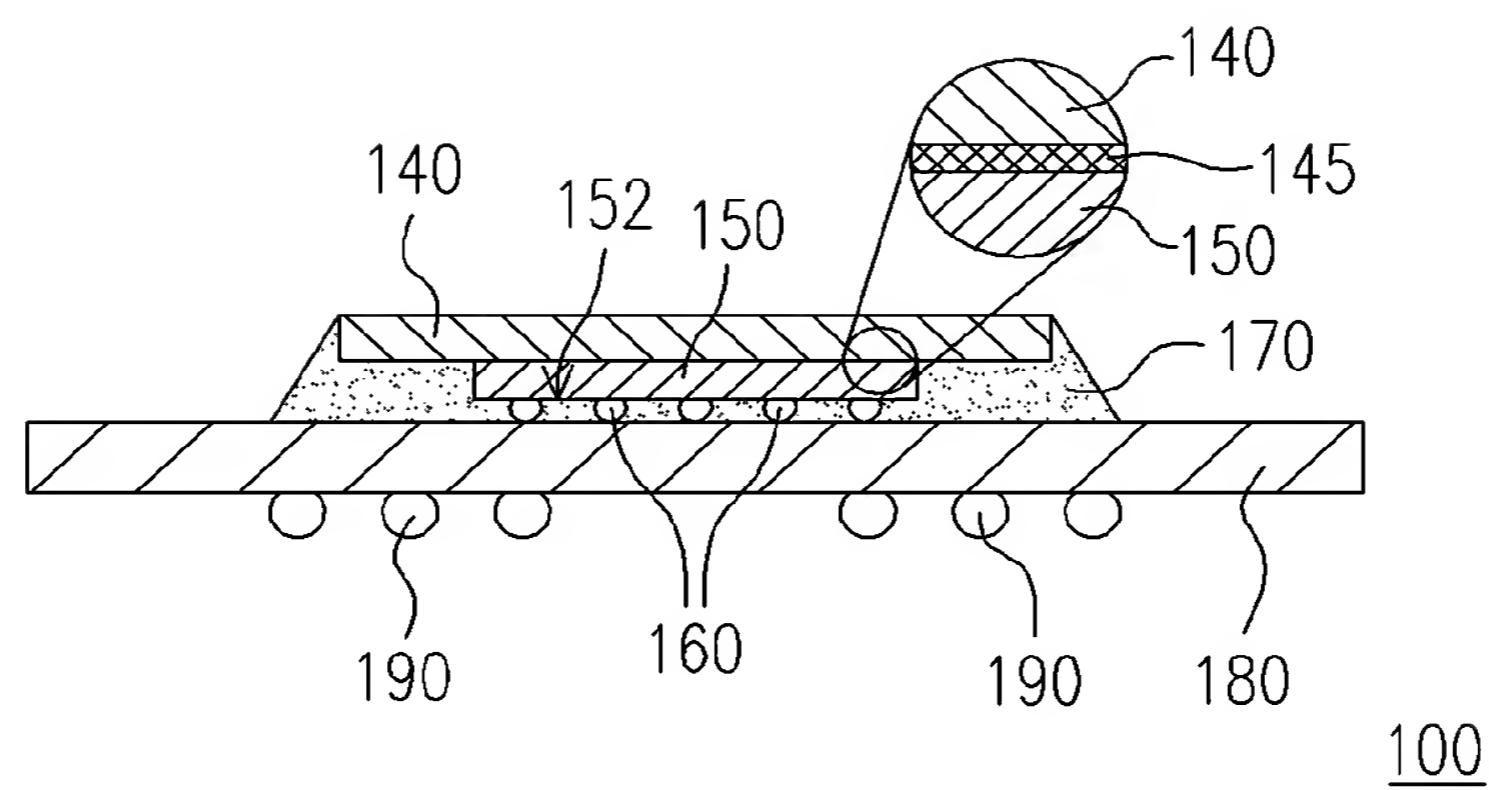


FIG. 4A

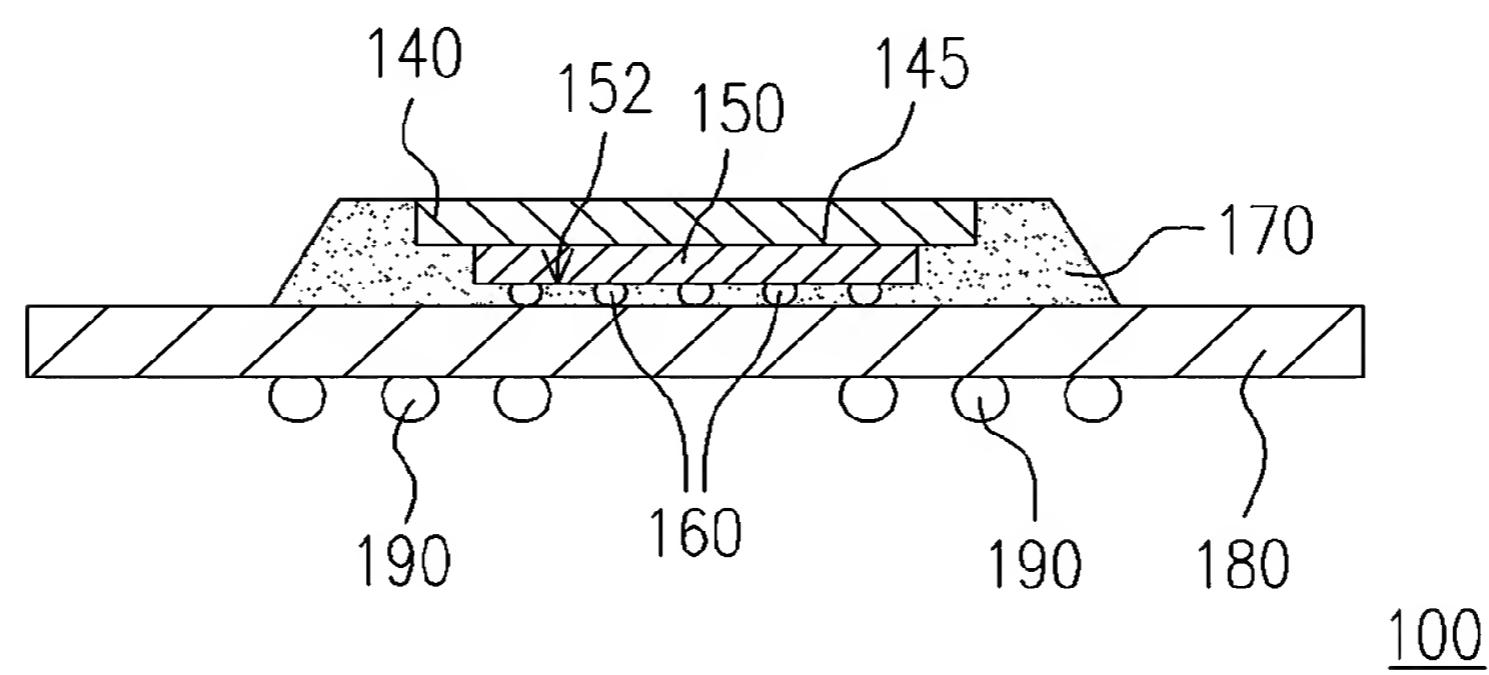


FIG. 4B

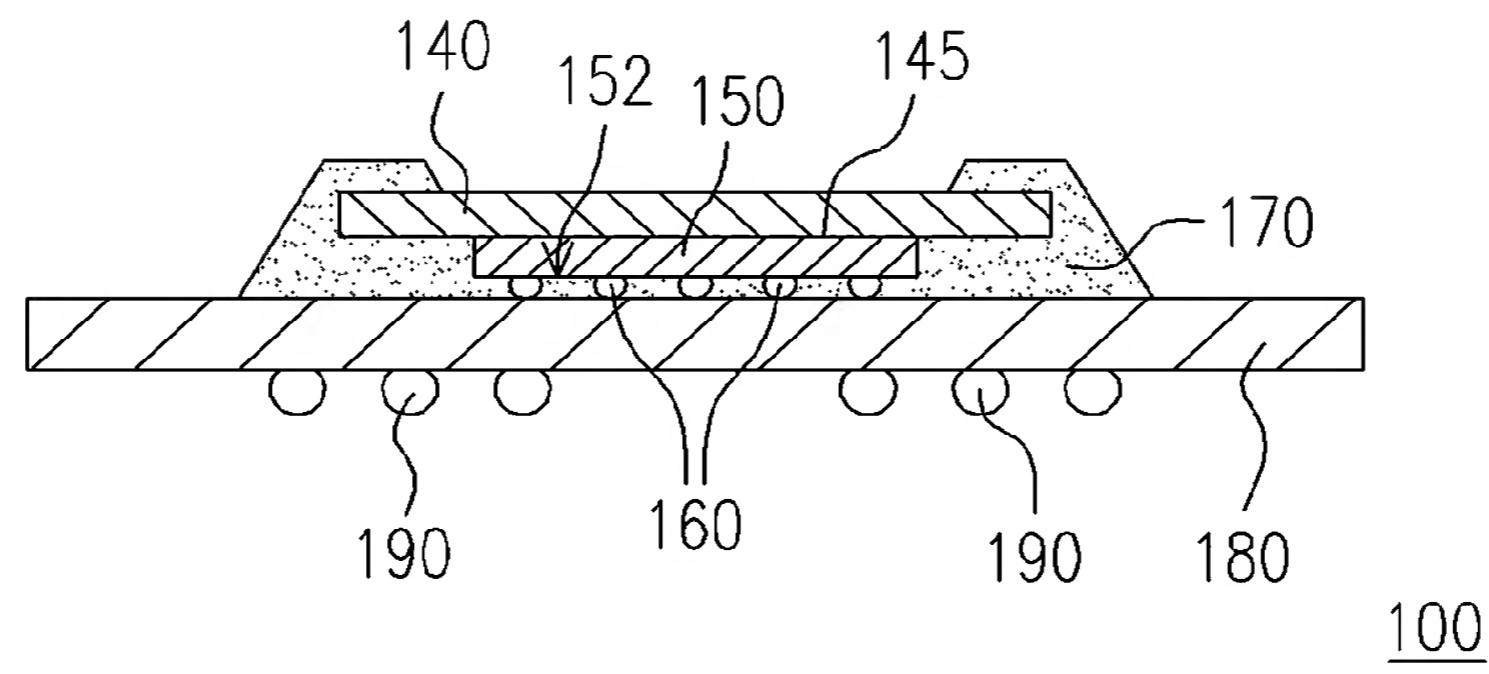


FIG. 4C

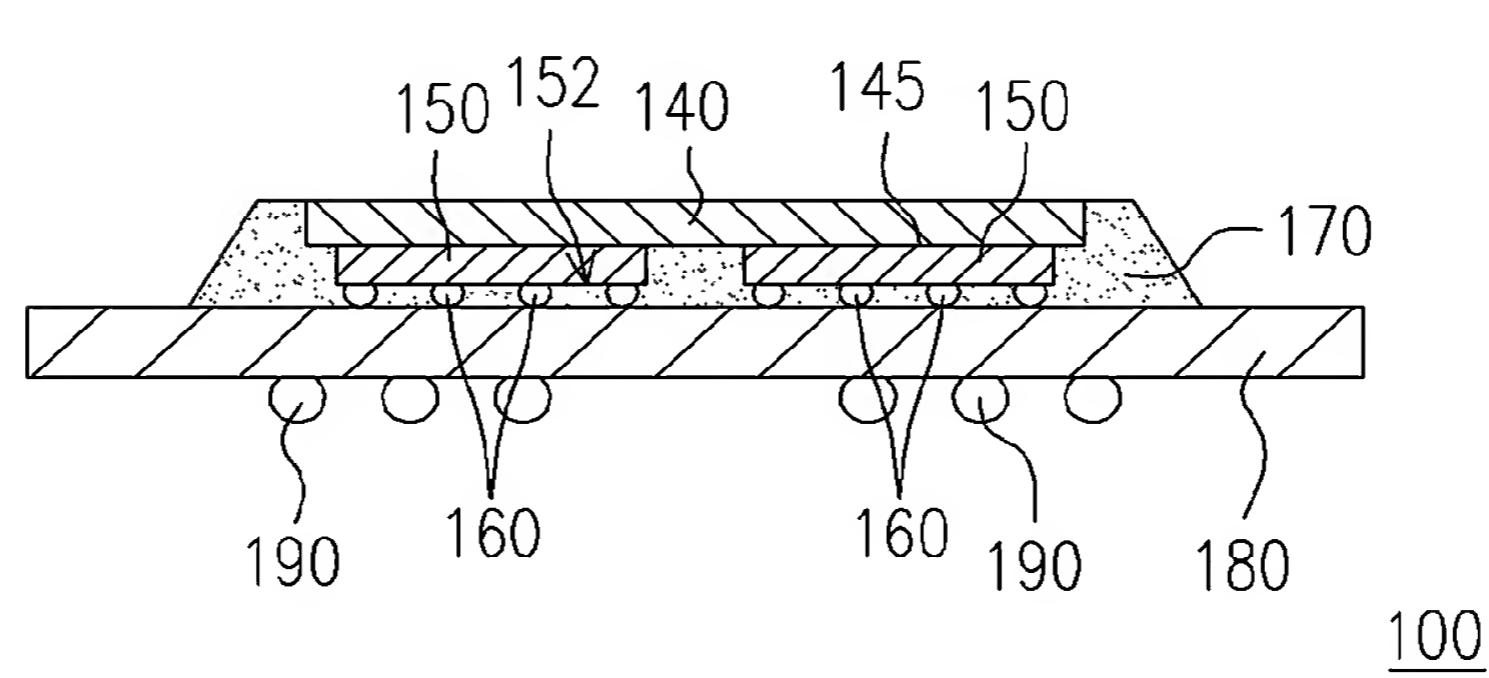
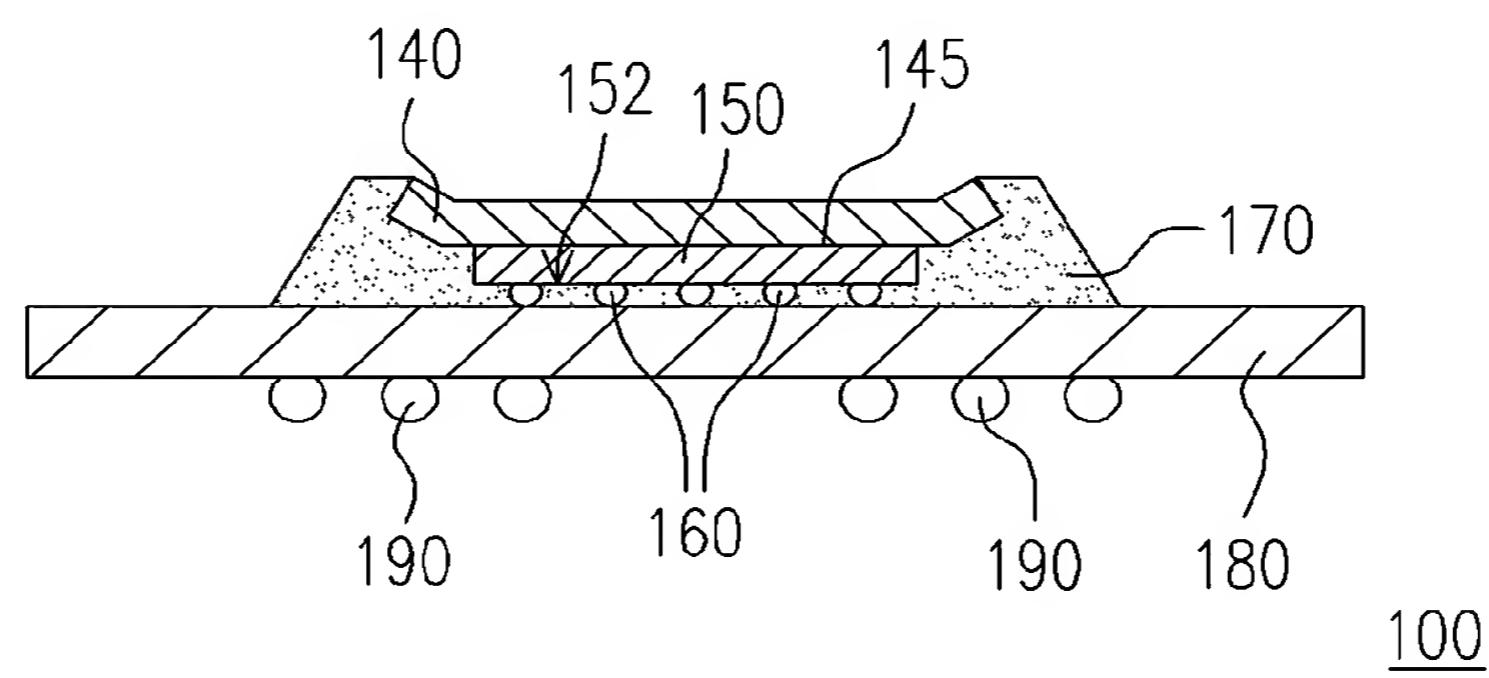
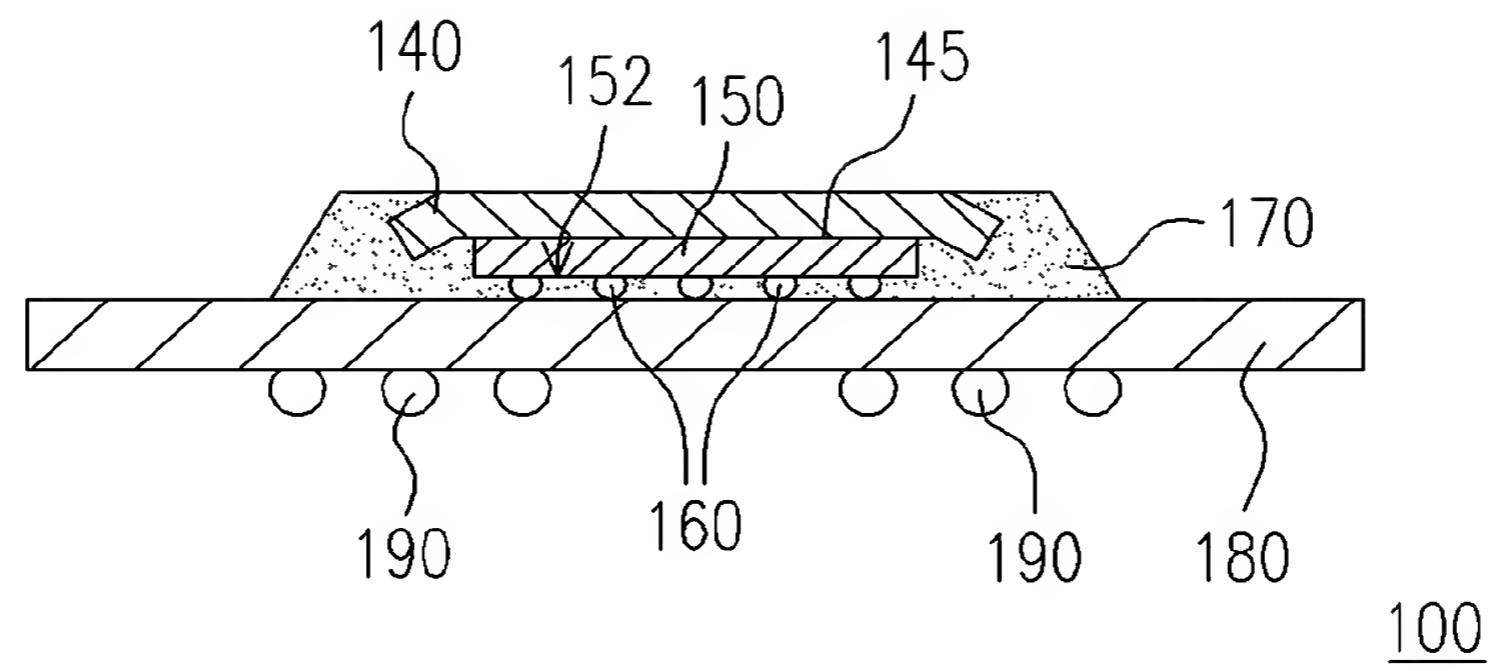
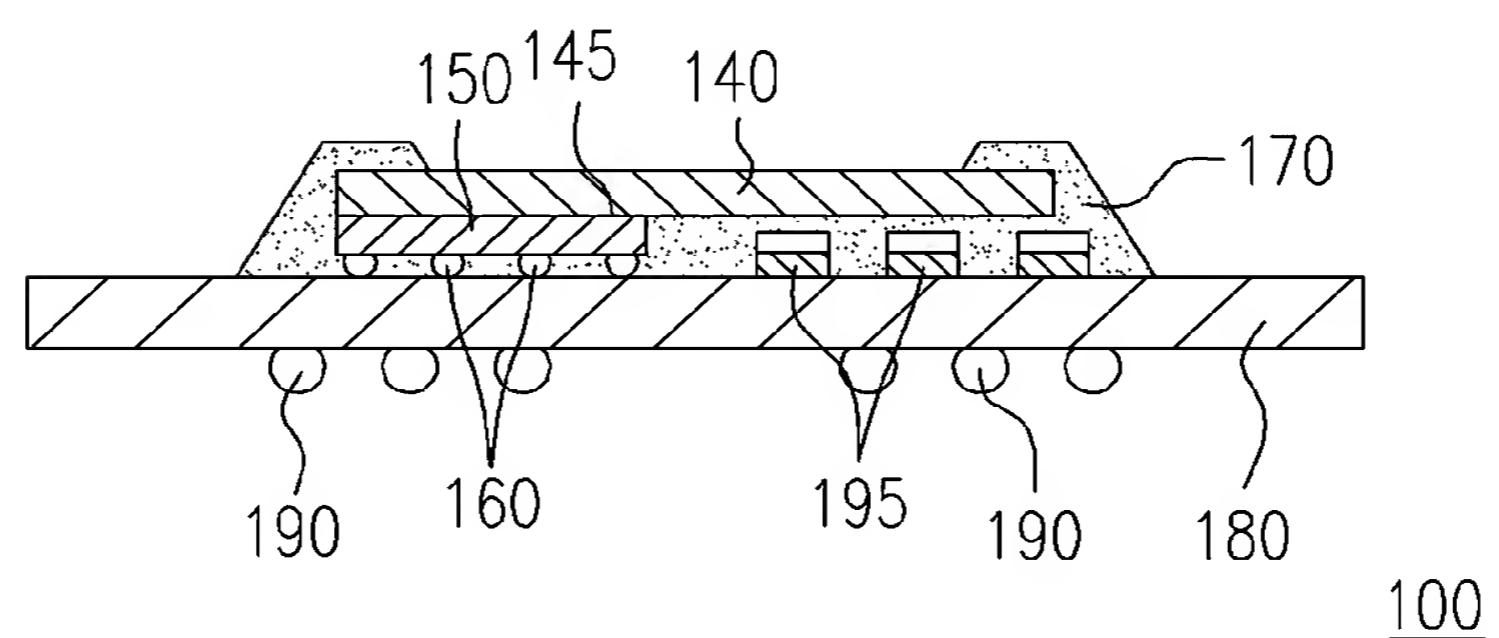
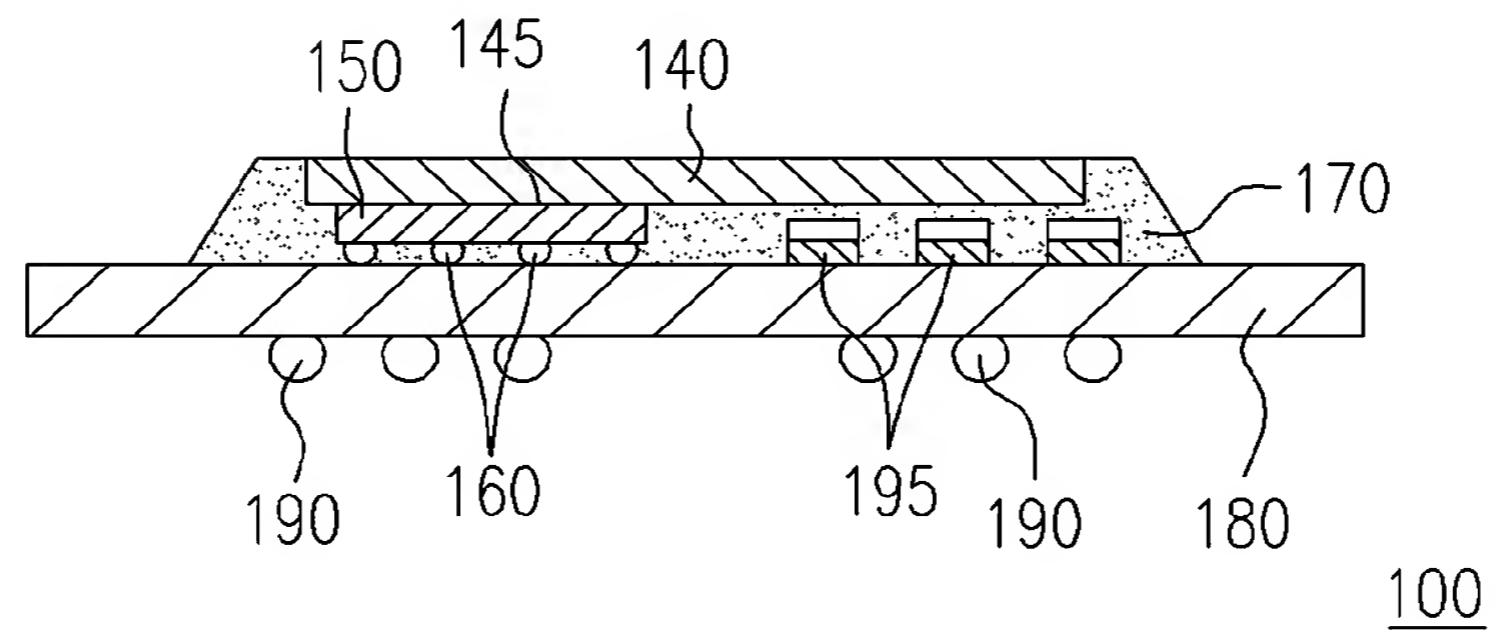
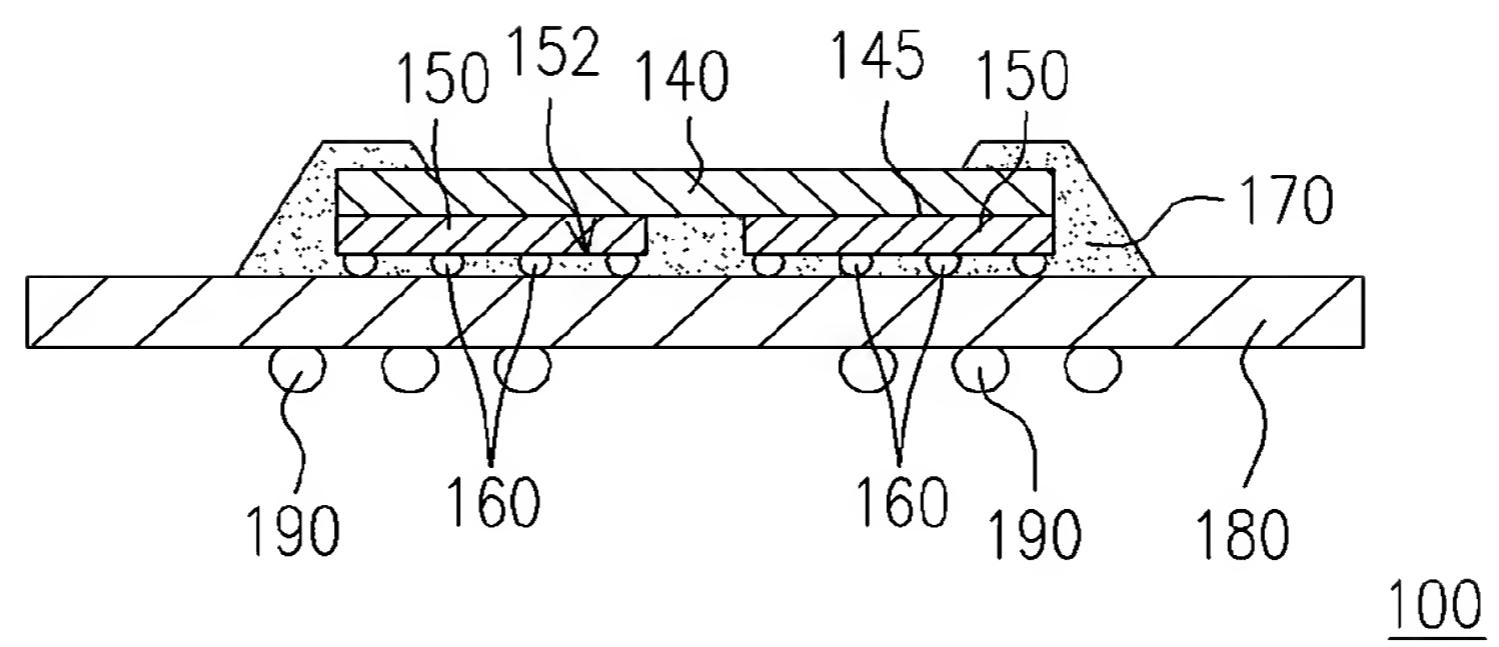
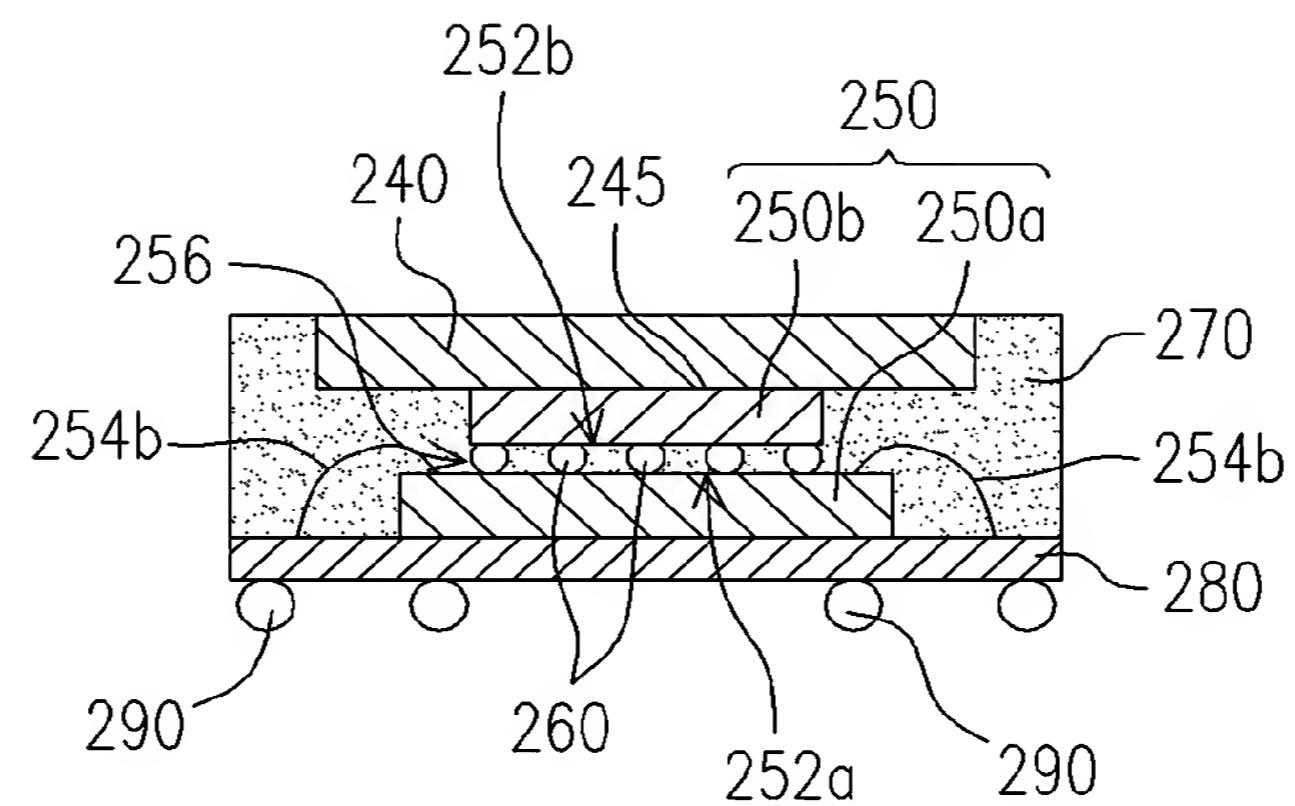


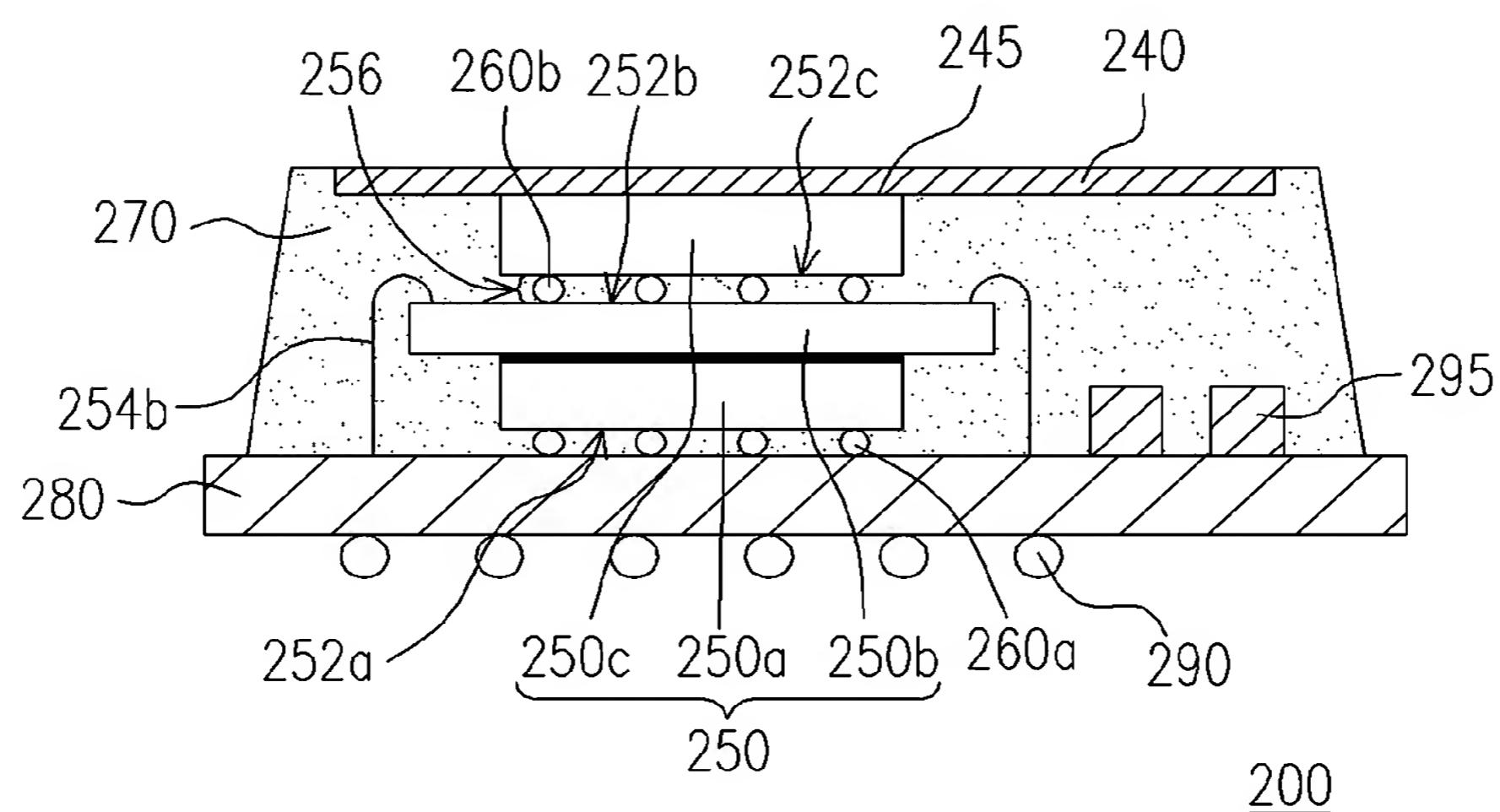
FIG. 4F





200

FIG. 5



200

FIG. 6

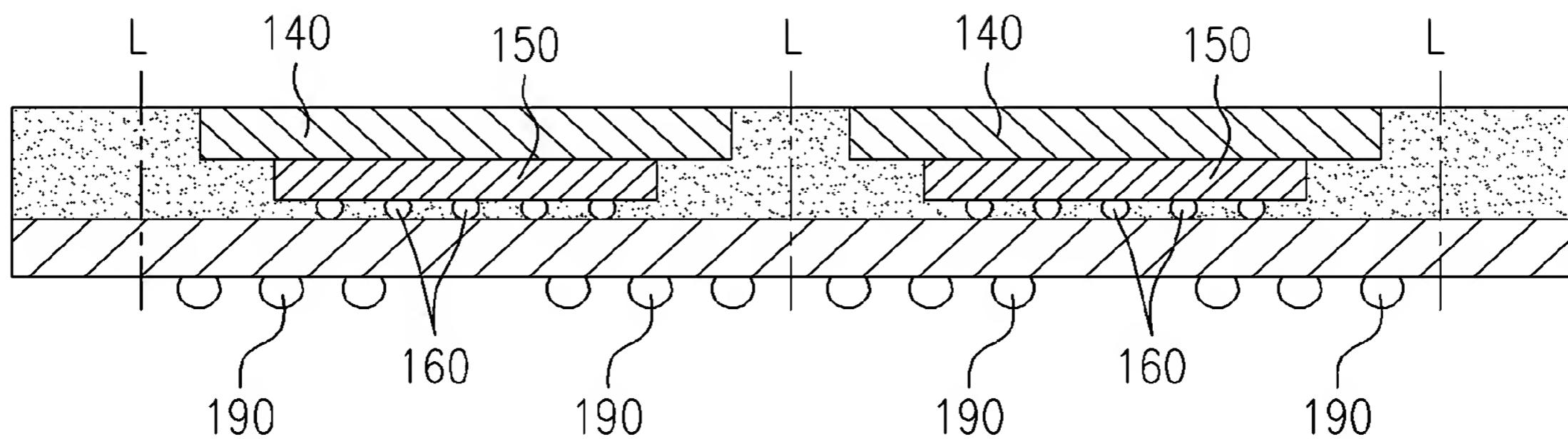


FIG. 7A

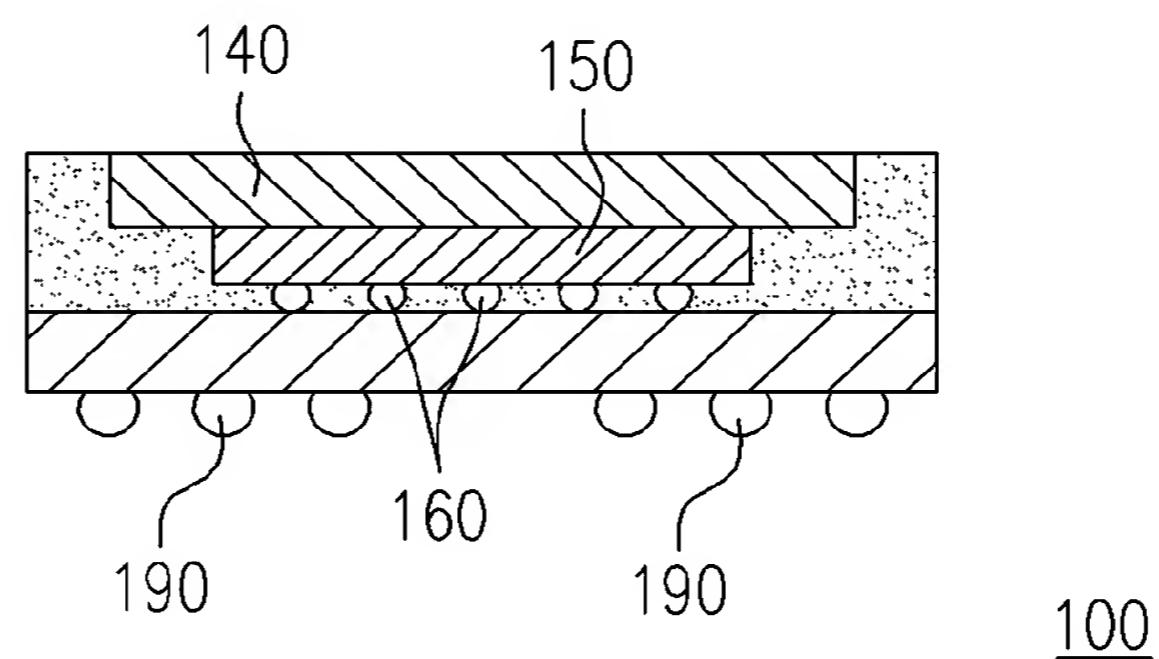


FIG. 7B

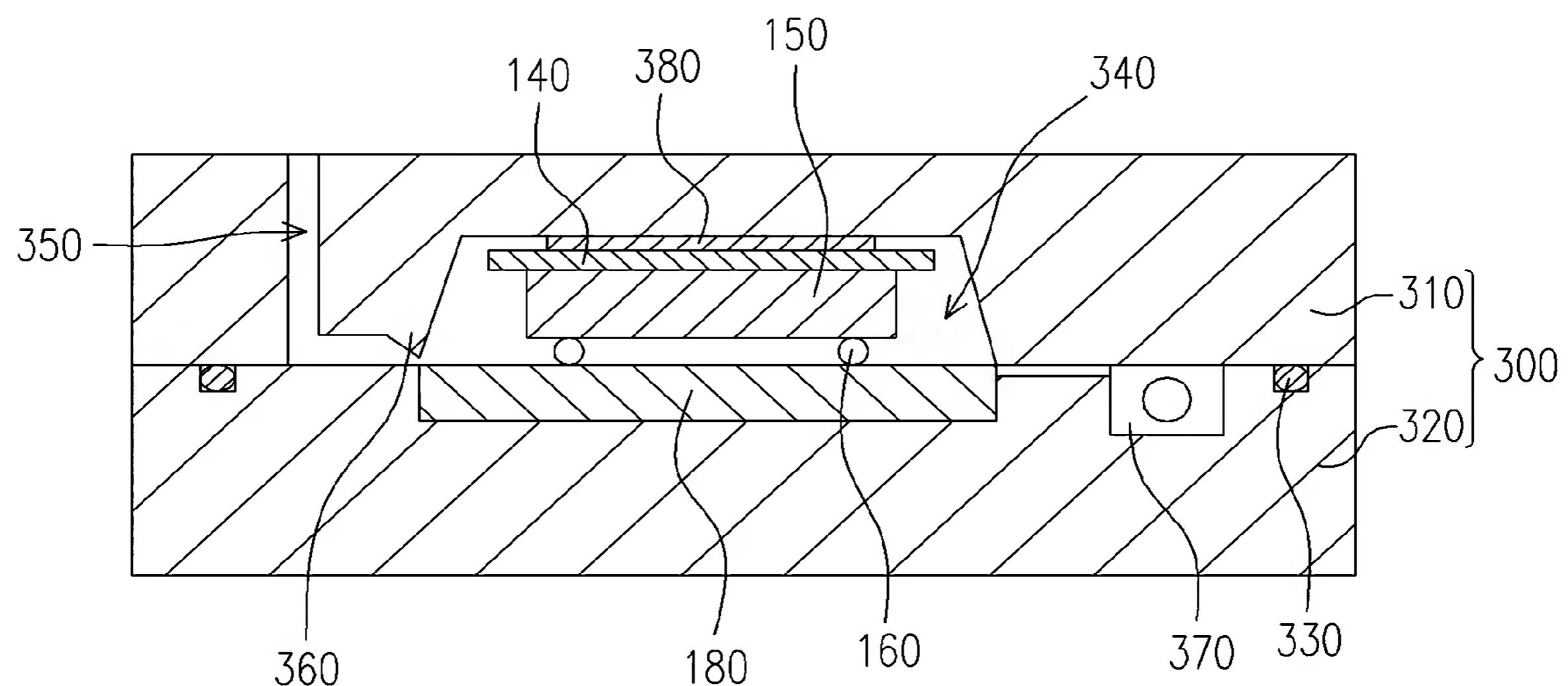


FIG. 8

	Examples 1, 6 – 8 and contrast examples 1, 5 and 6	Contrast example 2	Example 2	Example 3
Molding Temperature	170°C	170°C	170°C	170°C
Degree of Vacuum	1 mmHg	Atmospheric Pressure	15 mmHg	80 mmHg
Encapsulating Material Category (Silica) *1	A	A	A	A

\*1 Encapsulating material A: average particle diameter 5 µm  
 maximum particle diameter 21 µm  
 Encapsulating material B: average particle diameter 13 µm  
 maximum particle diameter 40 µm  
 Encapsulating material C: average particle diameter 13 µm  
 maximum particle diameter 74 µm

**Fig. 9**

	Example 1	Contrast example 1	Contrast example 2	Example 2	Example 3	Example 4	Example 5
Metallic surface flush	OK	OK	OK	OK	OK	OK	OK
Flip-chip bonding gap filling capacity *2	100%	100%	15%	99%	97%	100%	100%
Solder persistence *3	▲	O	X	O	O	▲	▲
Temperature recycle reliability *4	2000 cycles	500 cycles	--	2000 cycles	2000 cycles	2000 cycles	2000 cycles
PCT Reliability *5	>500 hours	168 hours	--	>500 hours	>500hour	>500 hours	>500 hours
Others							⑧
	Contrast example 3	Contrast example 4	Example 6	Example 7	Example 8	Contrast example 5	Contrast example 6
Metallic surface flush	OK	OK	OK	OK	OK	Maximum 2mm	OK
Flip-chip bonding gap filling capacity *2	40%	30%	100%	100%	100%	100%	100%
Solder persistence *3	X	X	▲	▲	▲	▲	▲
Temperature recycle reliability *4	--	--	2000 cycles	2000 cycles	2000 cycles	2000 cycles	--
PCT Reliability *5	--	--	>500 hours	>500 hours	>500 hours	>500 hours	--
Others							

\*2 relative to chip area, material filling area ratio (filling capacity) average value using SAT criteria

\*3 solder persistence: ▲: JEDEC level II passed; O: JEDEC level III passed;

(n = 11) X: JEDEC level III failed

\*4 temperature recycle reliability: gaseous surrounding, 65°C/15min ~ 150°C/15min  
(n = 11)

\*5 PCT reliability 121°C/2atms

⑧ assessed using a total of 32 molded devices, 2 defective devices/remaining non-defective devices

**Fig. 10**